

What is claimed is:

1. An isolated nucleic acid molecule encoding the human TREK-1 potassium channel comprising the nucleic acid sequence of SEQ ID NO:1.
2. An isolated nucleic acid molecule encoding a human TREK-1 potassium channel, wherein said TREK-1 potassium channel comprises the amino acid sequence of SEQ ID NO:2.
3. An isolated human TREK-1 potassium channel comprising the amino acid sequence of SEQ ID NO:2.
4. The isolated human TREK-1 potassium channel of claim 3 comprising an amino acid sequence that is at least 99% identical to SEQ ID NO:2.
5. The isolated human TREK-1 potassium channel of claim 3 comprising an amino acid sequence that is at least 97% identical to SEQ ID NO:2.
6. The isolated human TREK-1 potassium channel of claim 3 comprising an amino acid sequence that is at least 95% identical to SEQ ID NO:2
7. An isolated nucleic acid molecule encoding the murine TREK-1 potassium channel comprising the nucleic acid sequence of SEQ ID NO:3.
8. An isolated nucleic acid molecule encoding a murine TREK-1 potassium channel, wherein said TREK-1 potassium channel comprises the amino acid sequence of SEQ ID NO:4.
9. The isolated murine TREK-1 potassium channel of claim 8 comprising the amino acid sequence of SEQ ID NO:4.
10. The isolated murine TREK-1 potassium channel of claim 8 comprising an amino acid sequence that is at least 99% identical to SEQ ID NO:4.

*not Sub A*

*not Sub B*

*not Sub C*

*not Sub D*

*not Sub E*

*not Sub F*

*not Sub G*

*not Sub H*

*not Sub I*

*not Sub J*

*not Sub K*

*not Sub L*

*not Sub M*

*not Sub N*

*not Sub O*

*not Sub P*

*not Sub Q*

*not Sub R*

*not Sub S*

*not Sub T*

*not Sub U*

*not Sub V*

*not Sub W*

*not Sub X*

*not Sub Y*

*not Sub Z*

11. The isolated murine TREK-1 potassium channel of claim 8 comprising an amino acid sequence that is at least 97% identical to SEQ ID NO:4.

12. The isolated murine TREK-1 potassium channel of claim 8 comprising an amino acid sequence that is at least 95% identical to SEQ ID NO:4.

13. A method for identifying substances having anesthetic properties, wherein said substances produce a safe, reversible state of unconsciousness with concurrent amnesia and analgesia in a mammal upon inhalation comprising:

(a) contacting said substance with a mammalian potassium transport protein, wherein said potassium transport protein exhibits outward-going potassium rectification; and

(b) determining the potassium transport activity of said potassium transport protein, wherein an activation of potassium transport is indicative of said substance having said anesthetic properties.

14. The method of claim 13, wherein said potassium transport protein is TASK.

15. The method of claim 13, wherein said potassium transport protein is TREK-1.

16. The method of claim 15, wherein said TREK-1 comprises the amino acid sequence selected from the group consisting of SEQ ID NO:2 and SEQ ID NO:4.

17. The method of claim 15, wherein said mammalian potassium transport protein is a chimeric molecule comprising at least a portion of murine TREK-1 and at least a portion of human TREK-1 wherein said chimeric molecule comprises 2P domains and at least 4 transmembrane domains.

18. A method for identifying substances having anesthetic properties, wherein said substances produce a safe, reversible state of unconsciousness with concurrent amnesia and analgesia

in a mammal upon inhalation comprising:

(a) contacting said substance with COS cells, wherein said COS cells are transfected with a nucleotide vector comprising a nucleic acid molecule encoding TREK-1, wherein said COS cells transiently express said TREK-1 on a surface of said COS cells, and wherein TREK-1 exhibits outward-going potassium rectification; and

(b) determining the potassium transport activity of said TREK-1 wherein an activation of potassium transport is indicative of said substance having said anesthetic properties.

19. The method of claim 18, wherein said TREK-1 comprises an amino acid sequence that is at least 95% identical to SEQ ID NO:2.

20. The method of claim 18, wherein said TREK-1 comprises an amino acid sequence that is at least 95% identical to SEQ ID NO: 4.

21. The method of claim 18, wherein said ~~TREK~~-1 comprises a chimeric molecule comprising at least a portion of human TREK-1 and at least a portion of murine TREK-1.

22. A method for identifying substances having anesthetic properties, wherein said substances produce a safe, reversible state of unconsciousness with concurrent amnesia and analgesia in a mammal upon inhalation comprising:

(a) contacting said substance with transfected cells, wherein said transfected cells are transfected with a nucleotide vector comprising a nucleic acid molecule encoding TASK, wherein said transfected cells transiently express said TASK on a surface of said transfected cells, and wherein TASK exhibits outward-going potassium rectification; and

(b) determining the potassium transport activity of said TASK wherein an activation

of potassium transport is indicative of said substance having said anesthetic properties.

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23. The method of claim 22, wherein said TASK comprises an amino acid sequence that is at least 95% identical to SEQ ID NO:5.

24. The method of claim 22, wherein said TASK is a chimeric molecule comprising at least a portion of TASK and at least a portion of another potassium transport protein selected from the group consisting of human TREK-1 and murine TREK-1, wherein said chimeric molecule comprises 2P domains and at least 4 transmembrane domains.

25. The method of claim 22, wherein said transfected cells are selected from the group consisting of COS cells, HELA cells, *Spodoptera* cells, *Xenopus* oocytes, embryonic kidney cells, Chinese hamster ovary cells, and fibroblasts.

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